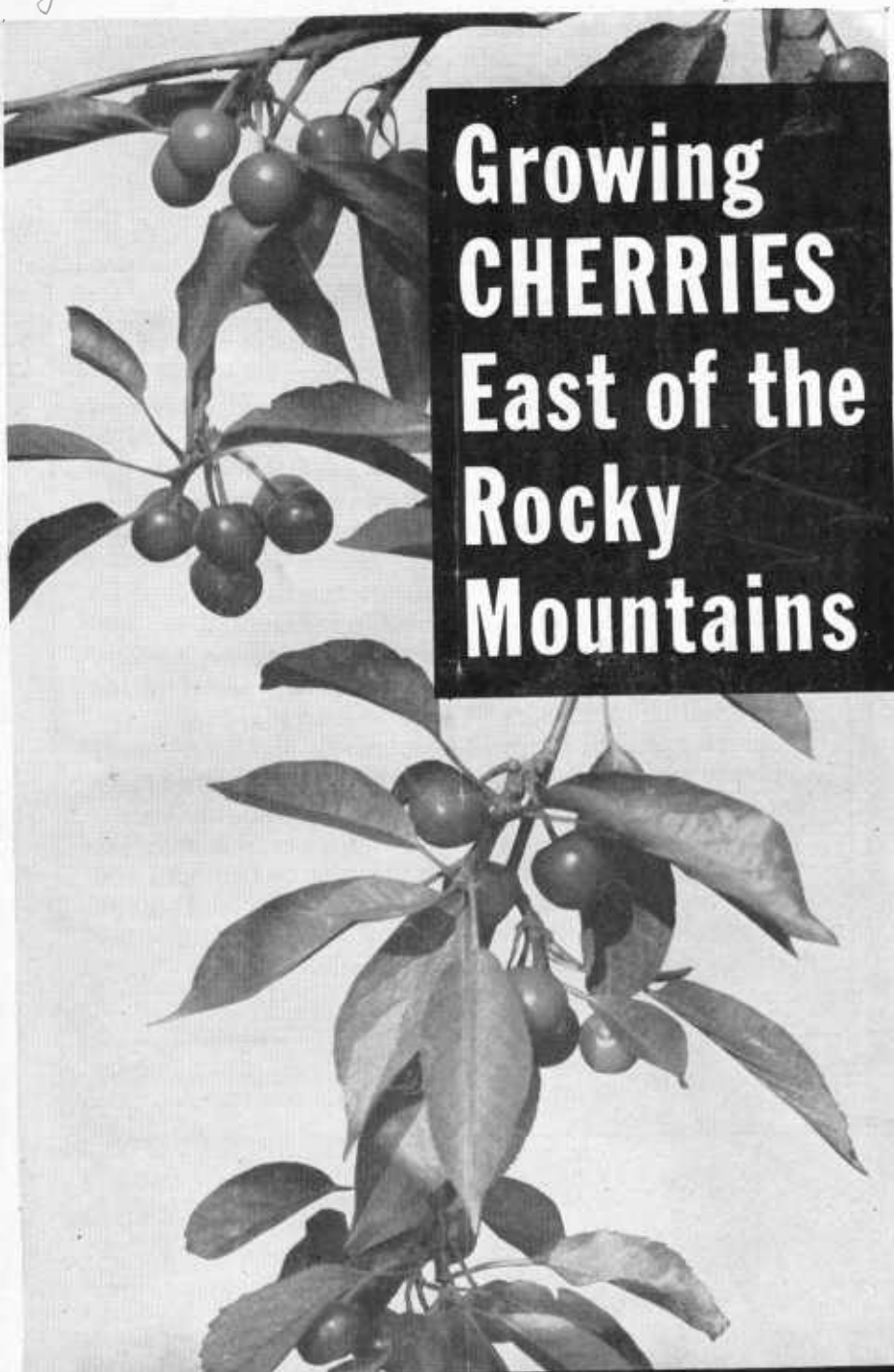

Growing CHERRIES East of the Rocky Mountains

FARMERS' BULLETIN No. 776
U. S. DEPARTMENT OF AGRICULTURE

CHERRIES are grown in all of the States east of the Rocky Mountains, but Michigan, New York, and Wisconsin lead. This bulletin outlines general directions for cherry growing which should be of most value to those who have had only limited experience with this crop. The suggestions made are intended only as a guide, since specific conditions call for more specific recommendations than can be given in a general bulletin.

A site that has been found to be relatively free from frost and a well-drained deep soil are essential for success in cherry growing. Well-rooted, vigorous nursery trees should be obtained, and the roots kept moist during the period from nursery digging to field planting.

Cherries should be pruned relatively lightly in order to obtain maximum production. Some of the basic rules learned from research and experience are outlined.

Proper timing, concentration, and types of sprays are essential to the control of such diseases as leaf spot and brown rot and of such insects as curculio and aphid. The suggested methods of control of these and other pests are an important phase of this bulletin.

Washington, D. C.

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Growing Cherries East of the Rocky Mountains [1]

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Contents

EXTENT AND DISTRIBUTION

SOUR CHERRIES are a widely grown crop in the United States, but the distribution of sweet cherries is more restricted. Duke cherries, which are hybrids between the sweet and sour types, are even more restricted in distribution. The more than 9,000,000 cherry trees of bearing age reported in the 1940 census were distributed in every State in the Union. State totals ranged from less than 350 in Rhode Island to more than 2,000,000 in Michigan. There were about 965,000 in New York, nearly 954,000 in California, and from approximately 200,000 to 700,000 in a number of other States (fig. 1). In some States having a relatively large number of trees the commercial interests are small. Such trees are distributed rather generally throughout the States, principally as small orchards, from which the fruit is usually sold in local markets.

In the decade 1930 to 1940 the number of bearing cherry trees in the country increased by about 1,000,000. During this period there was, however, a decrease of more than 1,900,000 trees of nonbearing age.

Climate is the most potent limiting influence in the distribution of fruit trees so far as natural surroundings are concerned. Of the various elements of climate, temperature probably governs the distribution of cherry trees oftener than any other.

As a rule cherry trees do not thrive well where the summers are long and hot and where winter temperatures are high for short periods. For this reason more than any other they are grown but little in the South; whenever they are planted in that part of the country they thrive best at the higher altitudes.

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[2] The author received very helpful suggestions from M. B. Hoffman, Cornell University, and V. R. Gardner, Michigan State College, in preparing this bulletin. The photographs for figures 3, 4, 5, 10, 11, 15, 23, and 27 were furnished by Cornell University.

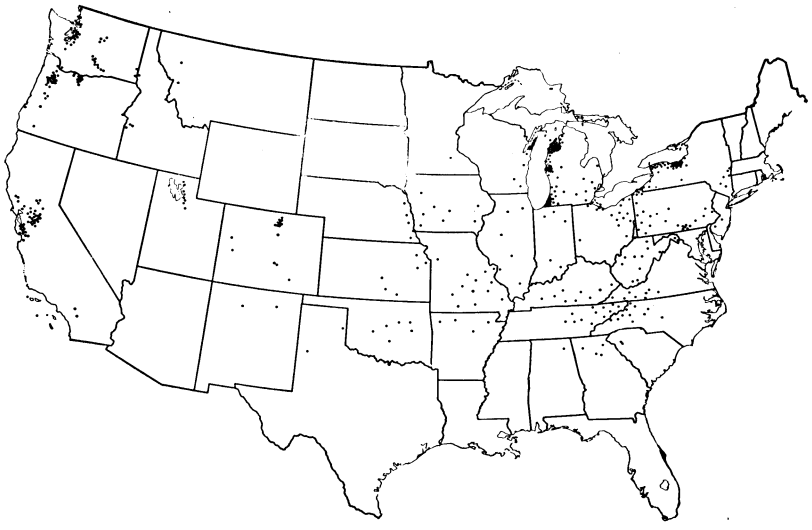

FIGURE 1.—Map of the United States showing the distribution of cherry trees in 1940. Most of those growing along the Pacific coast are sweet cherries. Note the wide distribution of trees and the concentration of plantings near the Great Lakes. Each dot represents 25,000 trees.

Winter injury to trunks of cherry trees is serious in some Central and Southern States (fig. 2). This is evidently caused by rapid drops in temperature that follow periods of warm weather during the winter. The widely grown sour-cherry varieties are usually less hardy than the apple varieties, such as McIntosh and Northern Spy, commonly grown in the northern commercial apple-producing areas. Sometimes the trunks and crotches are injured by low winter temperatures in many of the northern cherry-growing areas (fig. 3). Furthermore, sour-cherry blossoms are very susceptible to injury by low temperature in the spring. Often they are injured more than those of peaches in the same locality.

The most important commercial sour-cherry orchards are located in the Hudson River Valley, in western New York, in western Michigan, in northern Ohio, in the Arkansas River Valley in Colorado, in Larimer County in the north-central part of that State, and in Door County, Wis. Large quantities of cherries in the aggregate are produced in States and sections not specifically mentioned, but as a rule the orchards are small and do not represent important community interests. Sour cherries often produce well in the central and southern Great Plains region, where more tender fruits usually fail.

The leading varieties of sweet cherries are less hardy than the best-known sour sorts. Their endurance of cold corresponds more nearly to that of the peach. The sweet varieties are susceptible not only to wood and bud injury during the winter but also to frost damage to blossoms in the early spring.

The most important sweet-cherry-producing sections are in the Pacific Coast States, where the sour cherry is not grown extensively. East of the Rocky Mountains the commercial production of sweet cherries is confined very largely to the Hudson River Valley, to west-

ern New York, and to western Michigan. In the last two sections the climate is considerably moderated by the Great Lakes. Although sweet-cherry trees are more or less widely distributed in a large part of the country, the number of trees except in the sections mentioned is comparatively small.

Rather large cherry interests have been developed in one or two irrigated sections, particularly in centers of production in the Arkansas River Valley in Colorado and in certain other sections of that State east of the mountains. The size of cherry fruits is sometimes seriously affected by a drought occurring shortly before maturity. In general, however, cherry trees seem less affected by drought than are long-season fruits such as apples and peaches.

SITES FOR ORCHARDS

The site is the exact piece of land occupied by the trees. The same general factors that require consideration in selecting a site for an apple or peach orchard should be taken into account in choosing a site for cherries. The most important of these factors are soil and local climatic conditions.

Cherry trees thrive on a wide range of soil types, provided the soils are well-drained. Perhaps no fruit tree is more sensitive to the ill effects of a poorly drained soil than the cherry (figs. 4 and 5). In many important cherry-growing sections the soils of the prevailing type are rather light—sandy loams,

FIGURE 2.—Trunk of Montmorency cherry showing winter injury. This type of injury is often caused by rapid changes in temperature. The injury had occurred several years before the photograph was made and considerable healing had taken place, as indicated by the new bark along the right side of the wound.

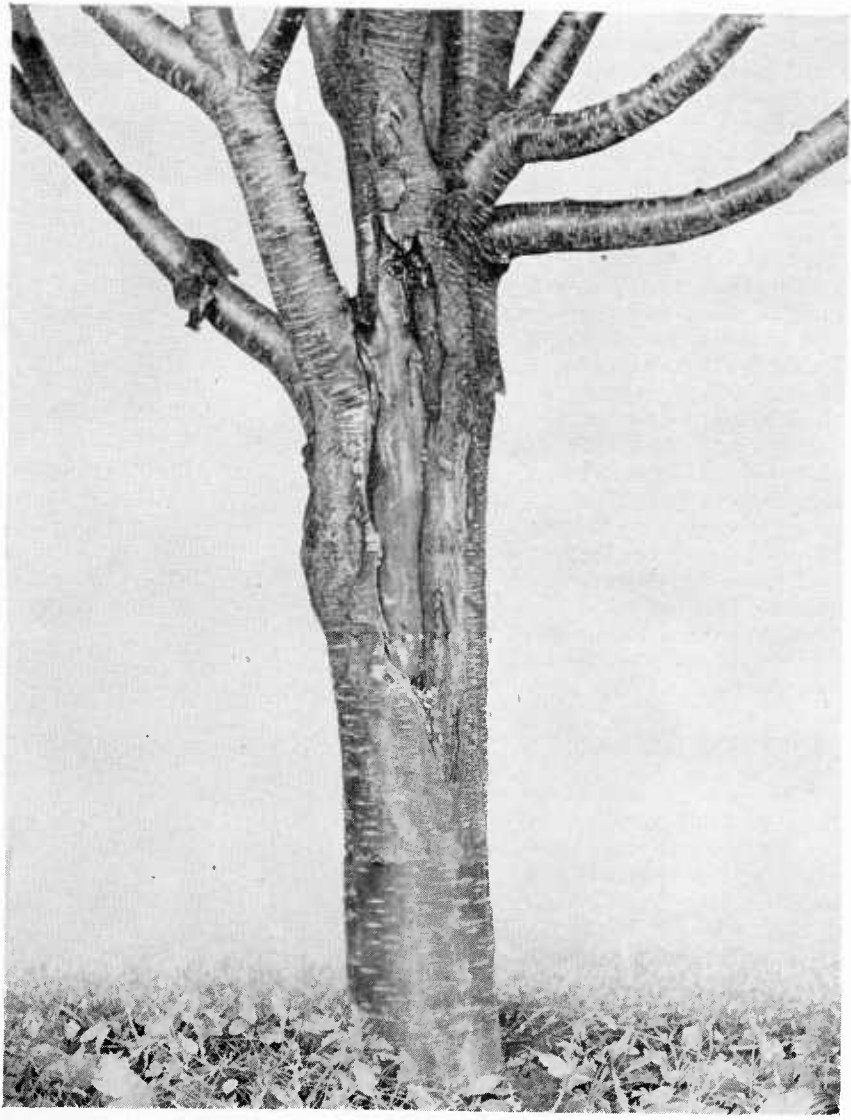

FIGURE 3.—Sweet-cherry tree showing winter injury to crotch and trunk. The injury occurred in New York after the late growing season that preceded a freeze in early December 1942.

and other light sandy soils—and commonly are underlain by a more or less clayey subsoil. Such soils occur in the districts bordering the Great Lakes, where the most important commercial cherry interests east of the Rocky Mountains are located. However, the industry doubtless has developed in these districts because of the climatic conditions that are induced by large bodies of water rather than because of the existence there of any particular soil type. Many of the better orchards in western New York are on Dunkirk clay loam, which is fairly heavy but well-drained. Because the heavier, clayey types often

are extremely retentive of moisture or are insufficiently drained for good results, the comparatively light soils are preferred for cherries. For success with sweet cherries the lighter, warmer types are usually regarded as essential. Soils that are especially droughty and dry out excessively are unsatisfactory for either type of cherry. Moderately productive soils give better results than those having either extreme in fertility.

The influence of the temperature factor on the geographic distribution of cherry growing has been mentioned, but its relation to local conditions also requires consideration. Cherries blossom comparatively early, the sweet varieties usually earlier than the sour ones. Therefore, sites that are subject to spring frosts during the usual blossoming period should be avoided. As cold air settles to the lower levels, orchards occupying sites somewhat higher than the surrounding areas are generally less liable to frost injury than those having comparatively low elevations. The soil of the higher areas is also likely to be better drained than that of the lower levels.

PROPAGATION AND CHOICE OF STOCKS

The details of propagating cherry trees are of little direct importance to the average grower, as he will usually find it to his advantage to buy trees from a reputable nurseryman. Trees are propagated by budding on seedling stocks in the nursery row, and 1- or 2-year-old trees are commonly sold for planting. Since virus diseases that reduce fruit production can be carried in the buds, it is essential that nurserymen use budwood only from trees that are free of such virus diseases.

Two kinds of stocks, the mahaleb and the mazzard, are in common use. These are two distinct types of cherry that are of value for stocks but unimportant for their fruit.

The mahaleb is used much more extensively than the mazzard. For the sour varieties it is generally satisfactory, especially if they are grown on soil good for cherries. Although the mahaleb stock is much used in propagating sweet cherries, there is considerable evidence that the sweet sorts often give better results when grown on mazzard

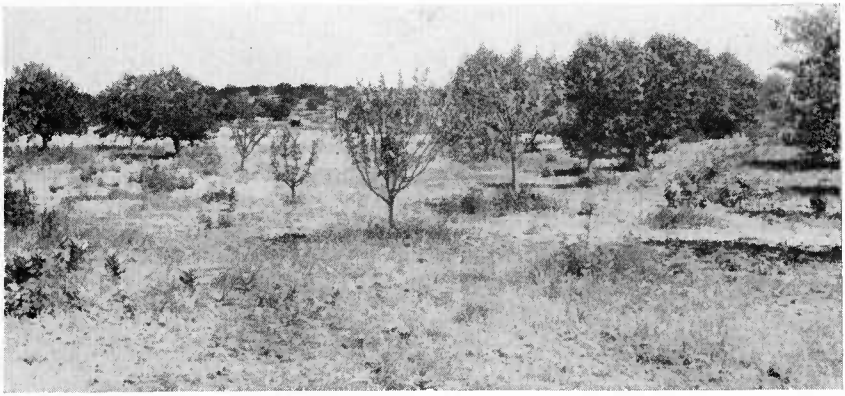

FIGURE 4.—Young sweet-cherry trees (foreground and center) that grew poorly because planted on poorly drained soil. Note that some had already been removed. Trees on higher ground and better drained soil (right and left) made good growth.

stock. Trees propagated on it appear more vigorous and longer lived than those propagated on mahaleb. Thus, mazzard stock is especially desirable for weak soils.

Some growers express a definite preference for the mazzard as a stock for sour cherries as well as for sweet ones. Their choice is based on the stronger and more vigorous growth sometimes made by trees propagated on mazzard stocks as compared with that of trees on mahaleb stock under the same conditions. Others maintain, however, that trees on mahaleb stock are preferable because they come into bearing earlier and produce heavier crops while young.

In general, mahaleb stock has been satisfactory for both sweet and sour cherries where the soil produces vigorous trees. The mazzard seems preferable, however, especially for the sweet varieties, where the soil may not be best for cherries.

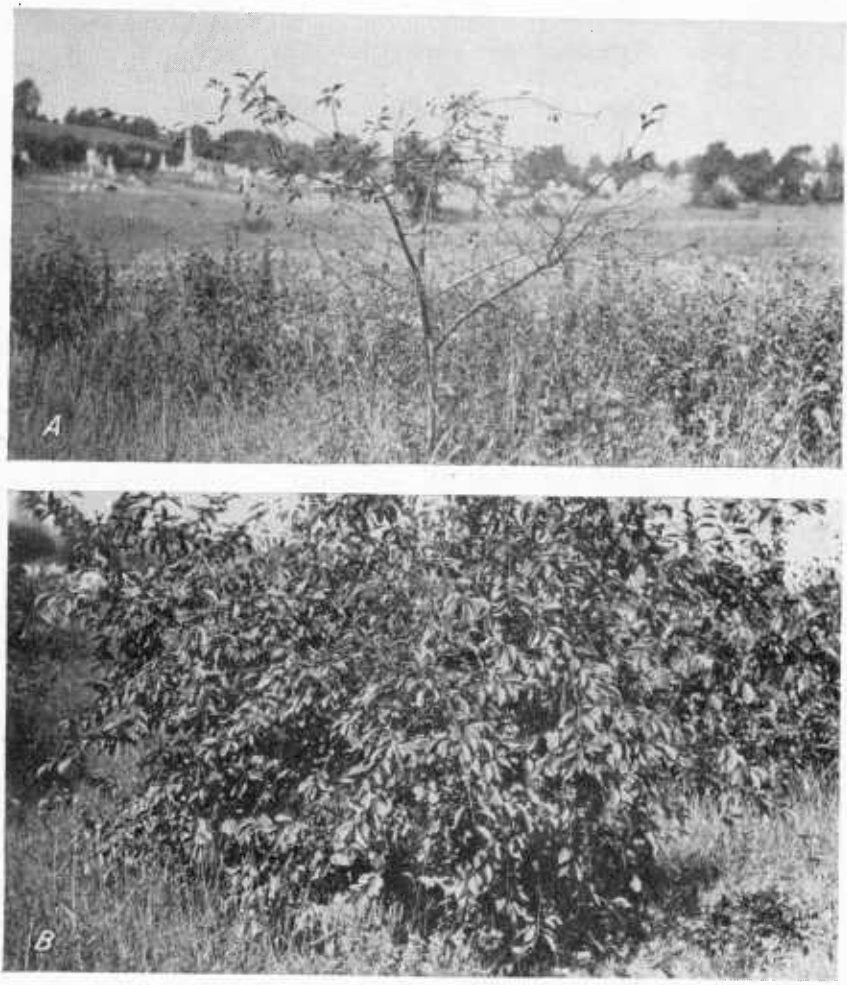

FIGURE 5.—English Morello trees 6 years old showing effect of soil drainage: *A*, On poorly drained soil; *B*, on well-drained soil. These trees were within 2 rods of each other, and the camera was at same distance from both.

For sour cherries 1- or 2-year-old nursery trees may be used. Medium-sized trees, 4 to 5 feet high and $^{9}/_{16}$ to $^{11}/_{16}$ of an inch in diameter, seem preferable, but smaller trees are often satisfactory (fig. 6).

There is a growing tendency to select 1-year-old trees of the sweet varieties. They should be medium-sized, 4 to 5 feet high and $^{9}/_{16}$ to $^{11}/_{16}$ of an inch in diameter.

The trees should be unpacked immediately after delivery, and every possible precaution should be taken to prevent the roots from becoming dry. Unless the number of trees is so limited that immediate planting is possible and the time for doing it is at hand, they should be heeled in (fig. 7). For this purpose a thoroughly well drained place where the soil is mellow and deep is required. A trench is made sufficiently

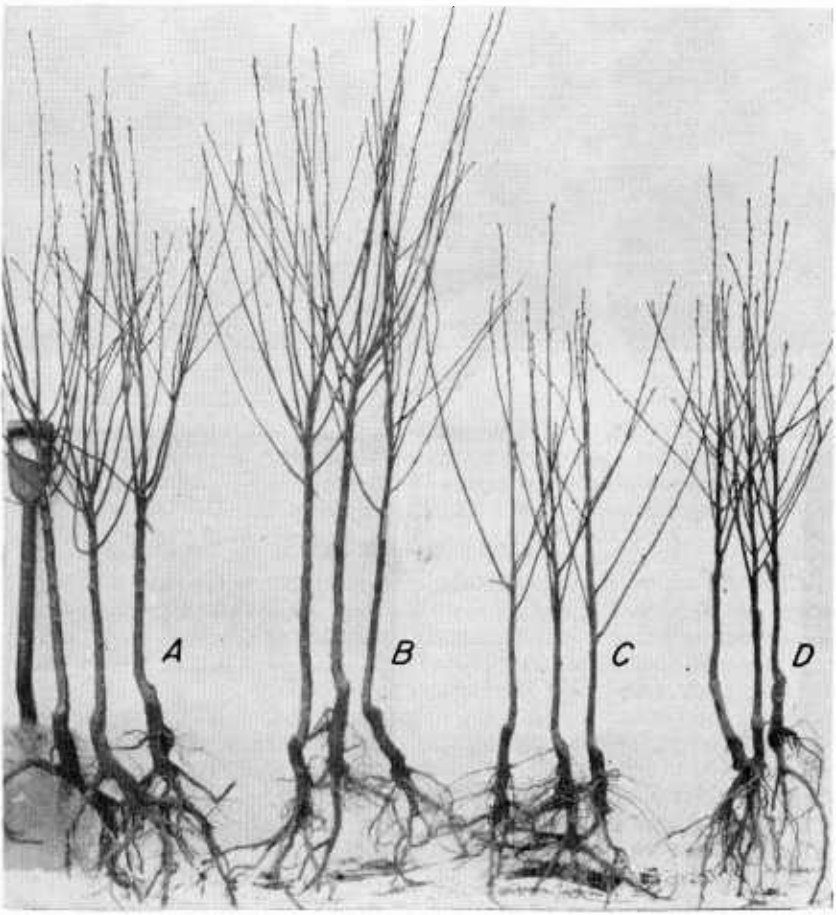

FIGURE 6.—Sour-cherry trees representing different grades of nursery stocks, as follows: *A*, 2-year-old Montmorency on mazzard stock, ¾ inch up in diameter, 5 to 7 feet high; *B*, same as *A* except on mahaleb stock; *C*, 1-year-old Montmorency on mazzard stock, ⅝ to $^{11}/_{16}$ inch in diameter, 3 to 4 feet high; *D*, 1-year-old Montmorency on mahaleb stock, ⅝ to $^{11}/_{16}$ inch in diameter, 3 to 4 feet high.

wide and deep to receive the roots, and the trees are laid in it at an angle. The soil should then be worked among the roots so as to fill all the spaces between them. If a large number of trees are to be heeled in, they are usually placed in closely adjacent rows. When this is done the roots in one row may be covered with the soil that is removed in opening the adjacent trench. Trees that are tied in bundles when received must be separated before they are heeled in. If this is not done, it is difficult to work the soil among the roots sufficiently to prevent them from drying.

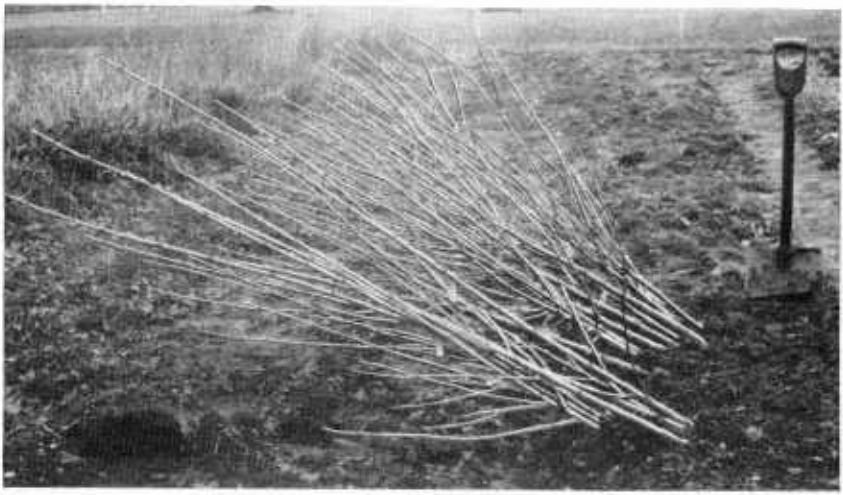

FIGURE 7.—Cherry trees heeled in.

It should be emphasized that cherry trees should be planted as soon as possible after they are dug in the nursery. Much loss of young orchard trees could be avoided if this were done. If at all feasible, the trees should be obtained and planted in the fall.

PLANTING THE TREES

In areas where the winters are extremely severe, spring planting is advisable. In the middle latitudes and wherever the winters are comparatively mild, fall planting generally is preferable. There is an increasing tendency toward fall planting in States as far north as New York, Ohio, and Michigan.

One factor in spring planting needs to be observed with special care. The buds of cherry trees swell and start growth very early. If they start to any considerable extent before the trees are planted, a high percentage of failures are likely to occur. Therefore, particular pains should be taken to hold the trees in a perfectly dormant condition until they are set out. Very early planting usually is the wisest plan.

Soil for cherry planting should be prepared according to the method found necessary for other trees and crops of like nature. It will vary with the location.

Cherry trees are planted various distances apart, depending on the topography of the land, the fertility of the soil, the varietal characteristics of the trees, and the preferences and conceptions of the individual grower. Some of the smaller sorts, such as the English Morello, are

sometimes planted 16 or 18 feet apart each way with good success. For most sour varieties 20 by 20 feet is generally accepted as satisfactory. On soils where trees grow well, a greater distance between them is desirable, particularly for strong-growing varieties like Montmorency.

The ill effect of too close planting is suggested in figure 8, which shows a Montmorency orchard about 21 years old in which the trees are 14 feet apart each way. The branches interlock, so that spraying is difficult; they are long, slender, and upright, and therefore it is difficult to gather a considerable part of the crop. (Compare these trees with the well-spaced ones shown in fig. 9.) On well-drained, fertile soil Montmorency trees may become too close even when they are planted more than 20 feet apart, and some of the trees may need to be removed for best orchard operation. The trees shown in figure 10 are obviously too close.

Probably 25 feet apart each way is the minimum distance advisable for sweet cherries, and many growers prefer 28 to 32 feet each way because they are convinced that in the end the greater amount of space is more satisfactory.

The square system is generally used for planting cherry trees; however, a contour system should be considered on sites where there is danger of erosion. Contour planting means planting each row of trees on a perfectly level line or on a line with a slight grade along which water can move slowly. Sometimes a system of terraces is also desirable. Soil and moisture conservation are important for the best production. Often the extra time required in planning and laying out a good conservation system is well spent. If a contour planting is made there should be a minimum distance of about 18 feet between rows of sour-cherry trees and about 22 feet between those of sweet-cherry trees.

FIGURE 8.—A Montmorency cherry orchard about 21 years old, New York. The trees are 14 feet apart each way and tall and the branches are long and slender, as a result of the trees being planted too close together. (Photographed May 6.)

The details of planting the trees in the ground do not differ from those usually followed with apples, peaches, or other fruit trees commonly planted in the sections where cherries are grown.

FIGURE 9.—A Montmorency cherry orchard with well-spaced trees including considerable low fruiting wood. Much of the fruit can be picked without ladders. This orchard is irrigated as occasion requires.

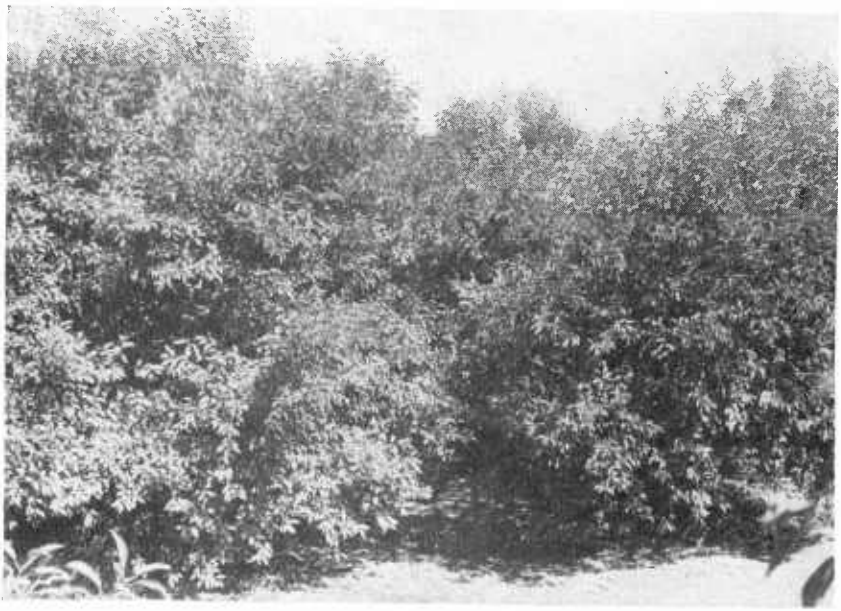

FIGURE 10.—Twelve-year-old Montmorency trees with the permanent trees planted 24 by 24 feet on a square system and with a semipermanent tree in the center of the square. These trees on mazzard stocks and in good soil are too close together. (Compare with those in fig. 11.)

FIGURE 11.—Well-spaced trees in a Montmorency cherry orchard. The semipermanent trees were removed when 12 years old. (Compare with fig. 10, which shows the same orchard before the semipermanent trees were removed.)

In preparing a tree for planting, all mutilated or injured parts of the roots should be trimmed off and long, slender roots, if they occur, should be cut off to correspond to the length of the main roots.

In handling the trees every precaution should be taken to prevent the roots from becoming dry. Undue exposure to cold or to drying out during the period that elapses between the trimming and the planting of the trees will injure them. Many poor stands of cherry trees have resulted from allowing the roots to become exposed just before planting. In filling the hole after a tree has been put into position and properly alined, only pulverized topsoil should be used around the roots. In this part of the operation much care should be taken to work the soil in closely about the roots. Moving the tree up and down very slightly as the hole is being filled will help to settle the soil among the roots. As the filling progresses, the soil should be firmly tamped about the roots; and when the operation is complete, the hole should be filled to the surface. If the soil is at all dry, the hole should be filled with water when it is about two-thirds filled with soil. After a few hours the hole should be completely filled with soil.

TILLAGE AND MAINTENANCE OF SOIL FERTILITY

Commercial cherry orchards are usually given clean tillage with a disk harrow during the early summer, or until about the middle of July. There is a great difference, however, in clean tillage as practiced by different growers. The ideal of some growers requires that their orchards be cultivated twice a week during the active growing period of the trees; the modern trend, however, is toward three or four cultivations during the entire season.

An early-summer cover crop should usually not be grown in the cherry orchard. The rapid growing of the fruits and shoots requires large amounts of moisture and soil nutrients. Cover crops in the orchard in the early summer, when most growth takes place, may compete seriously with the trees. If there is danger of soil and water loss in the orchard, it will be necessary to have a more continuous cover

crop than if erosion is negligible. Usually a cover crop may well be seeded at the last cultivation, at about the time the fruit is harvested. It is disked down the following spring. Some successful cherry growers just allow weeds to grow in the orchard during the late summer and fall; they disk the weeds down in the early spring. A planned cover-crop system is often necessary to prevent erosion, however, even on land where contour planting or terracing is not essential. Sometimes there are other advantages of cover crops, such as increasing the porosity of heavy soils, increasing the available soil moisture, and retaining the soil nutrients of sandy soils. Thus the type of cover crop used and the method of handling it vary in different districts and sometimes even on different farms in the same locality.

Rye, sown in late summer at the rate of about 1½ bushels per acre, makes one of the best cover crops for cherries in many sections. It should be disked down well before it matures in the spring, however, to prevent competition with the cherry trees for moisture and nutrients. Some prefer to use a late-summer crop that does not survive the winter, such as oats, millet, or buckwheat. As previously mentioned, others find a crop of weeds entirely satisfactory.

Sometimes cherry orchards can be maintained satisfactorily in sod, provided adequate nitrogen fertilizer is applied. Under a sod system, however, the trees may often suffer from lack of enough moisture unless the soil is deep. A mulch of straw, hay, or some such material around the trees is valuable; if available, it should be used with sod, especially on relatively shallow soil. The fact remains, however, that early-summer cultivation is usually preferable, and a continuous sod should be considered only when necessary to prevent erosion. Where bluegrass is native, it is one of the best sods; in other districts native grasses, lespedeza, and other legumes may be used.

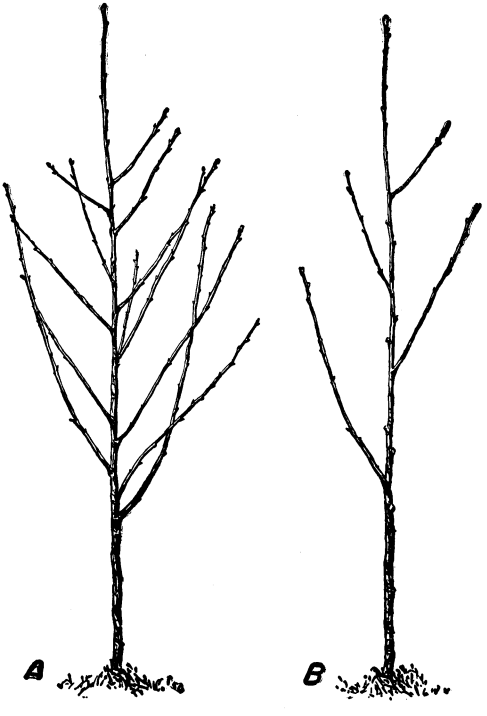

FIGURE 12.—One-year-old Montmorency cherry tree, approximately 3 feet high, showing method of pruning at time of planting: *A*, Before pruning; *B*, after pruning.

The application of a complete fertilizer, such as 5–10–5, at the rate of about 250 pounds per acre when the crop is planted is often valuable in obtaining a vigorous cover crop.

The fertilization procedure for cherries is similar to that necessary for other orchard trees and varies somewhat with the soil. Cherries usually respond well to nitrogenous fertilizers, such as sodium nitrate, ammonium sulfate, and ammonium nitrate. Because of differences in

soil no definite amount to apply can be given. As a general guide, ⅓ of a pound of sodium nitrate for each year of the tree's age may be used. Thus, a 6-year-old tree would be given 2 pounds of sodium nitrate or 1 pound of ammonium nitrate, since the latter contains twice as much actual nitrogen as the sodium nitrate. Usually the application of any other element is not necessary, but cherry trees in a few sections have responded to potassium. The fertilizer should be spread uniformly under and around the trees to just beyond the drip of the branches. The nitrogen fertilizer for the trees may be applied either in the fall or in early spring. It is usually necessary to apply more nitrogen to trees grown in sod than to those that are clean-cultivated. For example, trees in bluegrass sod require about three times the amount necessary for cultivated trees.

Though an orchard may endure an interplanted crop without appreciable ill effect, it is of no benefit to the trees unless the orchard receives better tillage than it would otherwise. Beans, peas, tomatoes, and other vegetables of like cultural requirements are the least objectionable. Crops that require late-summer cultivation should not be used in the Northern States, where winter injury of cherry is common because of the immaturity of the wood. The planting of an annual crop in an orchard is a system of double cropping in which the more important crop is the cherry. Though the tops require only a small part of the space above ground, the roots occupy a large part of the soil much earlier in their lives than is commonly supposed.

PRUNING

Trees of the sour-cherry varieties tend to be spreading in growth habit; those of the sweet varieties are more upright; and trees of the Duke varieties are intermediate in type. These different growth habits should be considered in pruning and training the trees. The modified-leader system is preferable for all types of cherries; but the sweet varieties, and to a less degree the Duke varieties, tend naturally toward a central-leader tree and it is best not to try to change them much.

SOUR-CHERRY TREES

Both the well-grown 1-year-old and the 2-year-old sour-cherry trees should be branched when received from the nursery. About four branches should be selected for main, or scaffold, limbs of the tree (figs. 12 and 13). The lowest scaffold limb should start 16 to 18 inches from the ground and the others should be well spaced around the trunk up and down so that none is directly over a lower one. Where possible, such scaffolds, or main branches, should be at least 4 to 6 inches apart up and down the trunk. If all are allowed to develop from the same height, a weak tree is likely to result (figs. 14 and 15). Only

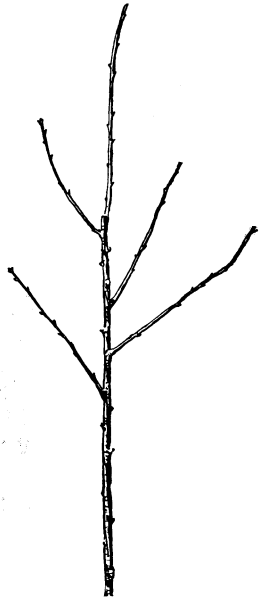

FIGURE 13. — Montmorency tree grown 2 years in the nursery and about 4 feet high, pruned properly for setting in the field. Note that the original leader was cut back after 1 year in the nursery but that the lateral branch selected as a leader was not cut back.

branches with the widest angles should be retained, for they will become the strongest limbs. The more vigorous branches should be selected for these scaffold limbs, and naturally they will vary in size and length. The more vigorous of these are cut back to about the length of the weaker ones, so that all may develop to approximately equal length. The main stem, or trunk, is not cut back at planting time and should be left higher than any of the scaffold branches (figs. 12 and 13).

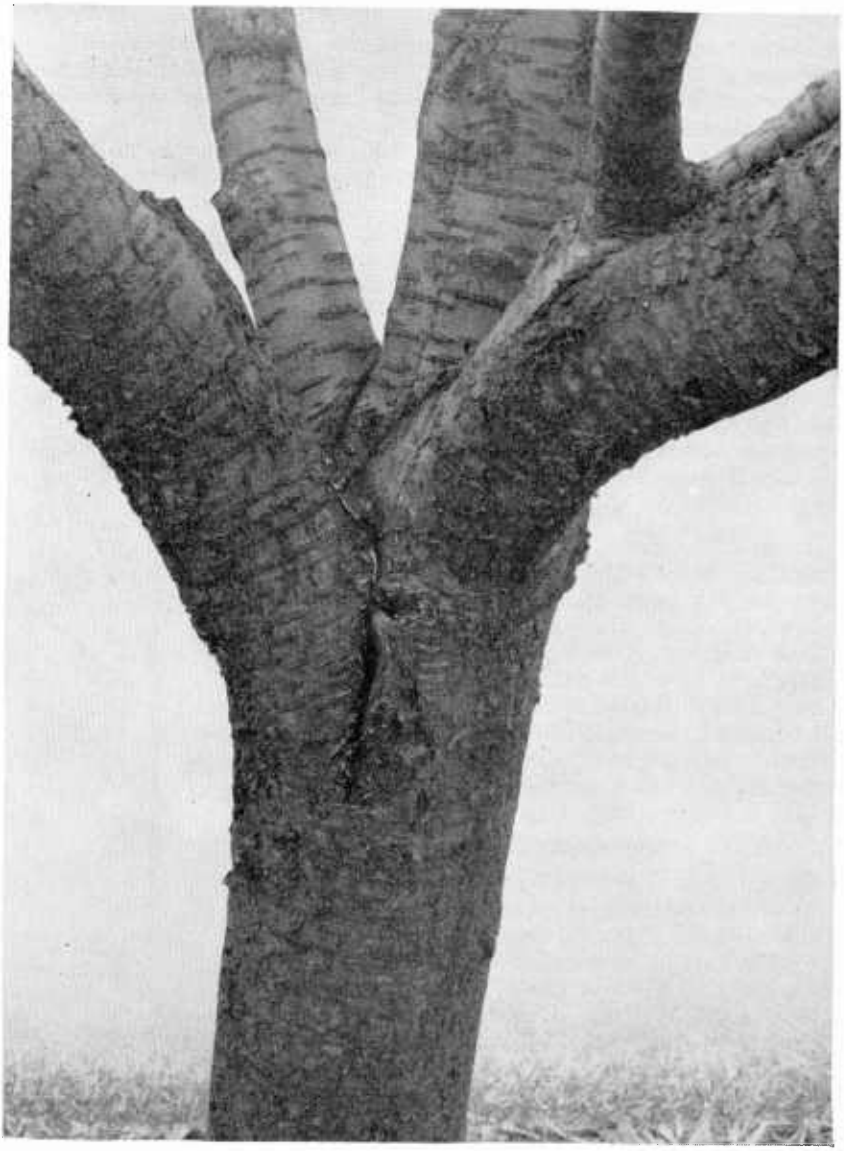

FIGURE 14.—Montmorency cherry tree with no leader and all scaffold limbs arising at the same height. The limb on the left is very weak at the crotch and is apt to break and leave a large wound on the trunk.

One year after planting, little pruning should be necessary. If extra scaffold limbs have been left at pruning, these can be removed. If some of the scaffold limbs are much more vigorous than others, they may be suppressed by (1) removing some of the lateral branches on the scaffold limb and (2) pruning back the main one to an outward- and upward-branching lateral.

After 2 years in the orchard the leader should be modified by being cut back to a strong outward and upward lateral. There should be another selection of two or three scaffold limbs on the upper part of the trunk, so that about six finally remain well distributed along approximately 3 feet of the trunk.

The pruning during the first 4 or 5 years is mainly to train the young trees so as to obtain maximum strength and productivity. Some pruning generally will be necessary each year to maintain a balance between the scaffold limbs. If some of them are allowed to develop more rapidly than others, the leader, as well as the weaker scaffold branches, will be choked out (fig. 16). More pruning than necessary, however, will delay bearing and dwarf the tree excessively.

When sour-cherry trees reach mature bearing age they require little pruning except some thinning-out of weak branches, especially on the inside of the tree (fig. 17). If this is not done, they become bushy and hard to spray and pick, and bear many small, unevenly ripening fruits (fig. 18). Sometimes it is best to head back trees that become too tall. This can be done best by heading back the outgrowing branches. Moderately light pruning accompanied by adequate nitrogen fertilization will aid in maintaining good terminal growth and vigorous spurs.

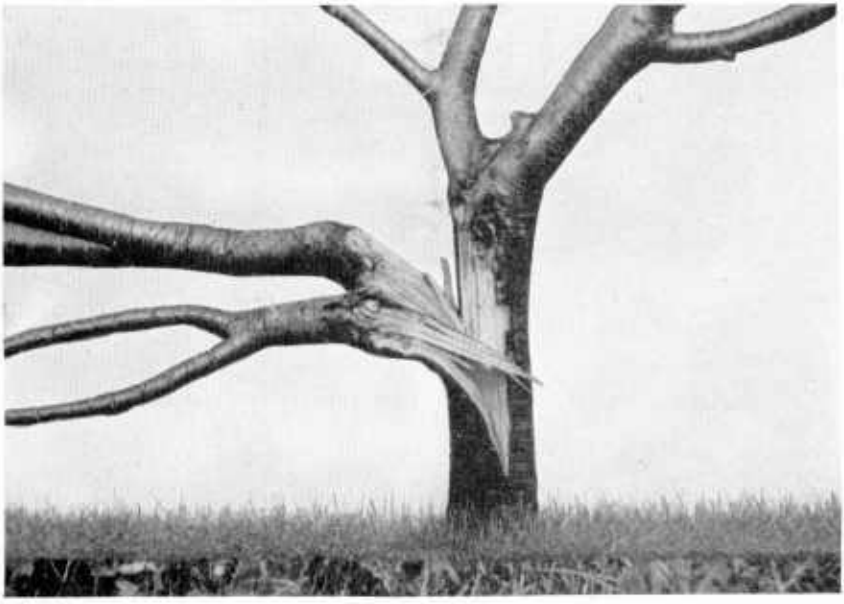

FIGURE 15.—Eight-year-old cherry tree showing the type of scaffold-limb breakage common on cherry trees on which several limbs are allowed to develop at the same height.

A 1-year-old sweet-cherry tree has few lateral branches or none when received from the nursery. If a 4- to 5-foot tree is used, many prefer not to cut back the leader for at least 2 years. If there are any branches, they may be selected and spaced around the trunk by much the same method as described for sour-cherry trees. The branches

FIGURE 16.—Three-year-old Montmorency cherry tree with weak crotch that resulted from allowing the scaffold branches to crowd out the leader.

FIGURE 17.—A vigorous Montmorency cherry tree approximately 7 years old. It received little pruning after the selection of scaffold branches. Little was needed when the tree was photographed except a light thinning out of weak limbs in the center. Note the strong, well-spaced scaffold branches.

selected should be cut back only if necessary to reduce the longest ones to about the same length as the shortest.

The scaffold branches of a 2-year-old sweet-cherry tree can usually be selected at the time it is set out. These limbs should have wide angles, and a distance between the limbs of 8 to 10 inches up and down is none too much. Well-selected branches will be stronger and more resistant to winter injury than poorly formed ones. Only the largest and most vigorous ones should be cut back at all, and they very little. Many well-formed sweet-cherry trees have no pruning at all from the

FIGURE 18.—A 12-year-old Montmorency cherry tree that had received no pruning for 5 years and very little before that. When photographed, it was too bushy for uniform ripening of high-quality cherries, for thorough spraying, and for easy harvesting the fruit. Some thinning of weak limbs in the center, however, was all that was needed. Note the strong, well-spaced scaffold branches.

time they are set until they reach maturity. Some pruning, however, to maintain a balance in growth of scaffold branches is usually best (fig. 19).

Between the ages of 2 and 7 years, when sweet-cherry trees usually come into bearing, pruning should be very light. The tree should be pruned only enough to aid in balancing the scaffold limbs and direct the leader to an outside branch if it becomes extremely vigorous (fig. 20).

When sweet cherries come into bearing, very little pruning is necessary. Removing dead or broken limbs and thinning out weak ones are usually all that is desirable (fig. 21). When they become too high for convenience in spraying and picking, the most upright limbs may be cut back to the outward-growing branches (fig. 22).

PICKING AND PACKING THE FRUIT

PICKING

The manner in which cherries are picked is governed partly by the disposition to be made of them. When they are to be sold on the local fresh-fruit market or shipped to a distant market the stems must be left on the fruit; if the stems are pulled off, the juice will ooze from the fruit. Sweet varieties and Dukes are usually harvested with the stems attached.

When harvesting cherries with the stems on, the picker carefully grasps at one time the stems of several fruits in a cluster and strips them from the tree by giving a slightly backward twist and pull. If care is exercised, the stems will remain firmly attached to the fruit and the spurs will not be broken or otherwise injured. In one important cherry-growing district the common method of removing the cherries is to clip the stems with scissors or shears. When pickers become accustomed to using shears, they usually object to picking in any other way; but probably it is not quite so rapid as stripping the fruit by hand.

If the fruit goes to a processor for canning or freezing, it is commonly pulled from the stem. Processors usually pay more for fruit picked in this way, because they are saved the expense of stemming after the fruit reaches the cannery and a given bulk of cherries without stems contains an appreciably larger quantity of actual fruit than an equal bulk with stems.

Comparatively small receptacles are used by pickers when harvesting cherries. Handling cherries in an orchard from which the fruit is taken at once to a processor is shown in figure 23. Here the fruit is being pulled from the stems. The picking pail holds 9 quarts. The fruit is emptied from the pails into lugs, in which it is hauled to the processing plant. In some instances 5- to 8-pound baskets also are used for picking; other types of pails, baskets, or similar receptacles of 5- to 9-quart capacity are not uncommon among the average picking gang.

A picker commonly attaches the picking receptacle to himself by passing a belt through the bail or handle. Frequently, also, a hook is placed on the handle, thus making it convenient to hang the pail or basket on a limb or on a rung of a ladder.

Under good crop and tree conditions an average picker will harvest as many as 400 pounds in a day.

Where limbs are near the ground much of the fruit can be picked without climbing, but to reach the fruit on the higher limbs straight ladders or stepladders are used.

Picking is paid for usually by the pound or quart, but sometimes by the gallon, case, or crate. In nearly all commercial orchards it is piecework rather than work by the day.

Assembling an adequate number of pickers is a criti-

FIGURE 19.—A 7-year-old sweet-cherry tree of the Windsor variety that received little pruning after being planted. Too many of the lower branches originate at the same height; otherwise the tree is rather well shaped and requires little pruning.

cal feature in the proper handling of a crop of cherries. The fruit should not be picked until it is ripe. When this stage is reached, the fruit should be removed very promptly; otherwise it will deteriorate. Under favorable conditions the period during which fruit trees of the

FIGURE 20.—A 13-year-old sweet-cherry tree of the Windsor variety that had been systematically pruned each year.

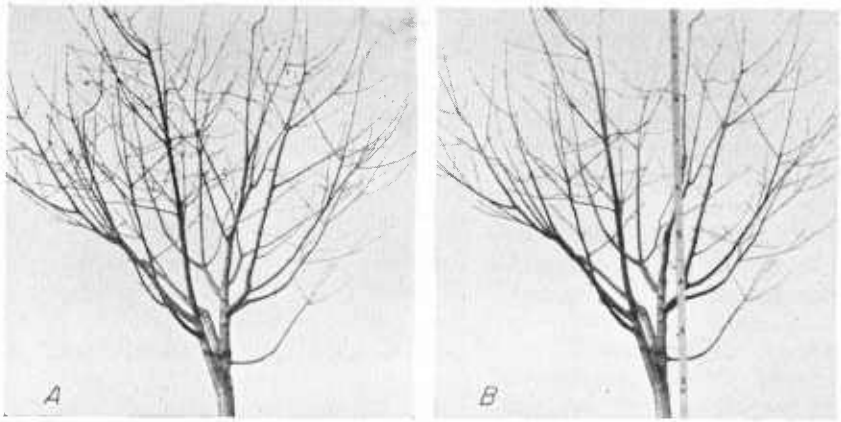

FIGURE 21.—*A*, A 6-year-old sweet-cherry tree that has never been pruned except for the selection of scaffold branches. Note the well-spaced, wide-angled scaffold branches and the modified leader. *B*, Same tree after a light thinning-out pruning.

more important varieties may be harvested ranges from 5 or 6 to 10 or 12 days. In orchards where the fruit is ripening uniformly, so that the trees can be stripped at one picking if desirable, a force of 8 to 12 pickers to the acre is not unusual.

It is not always easy to decide just when cherries should be picked. The tendency is to pick them as soon as they are slightly colored and

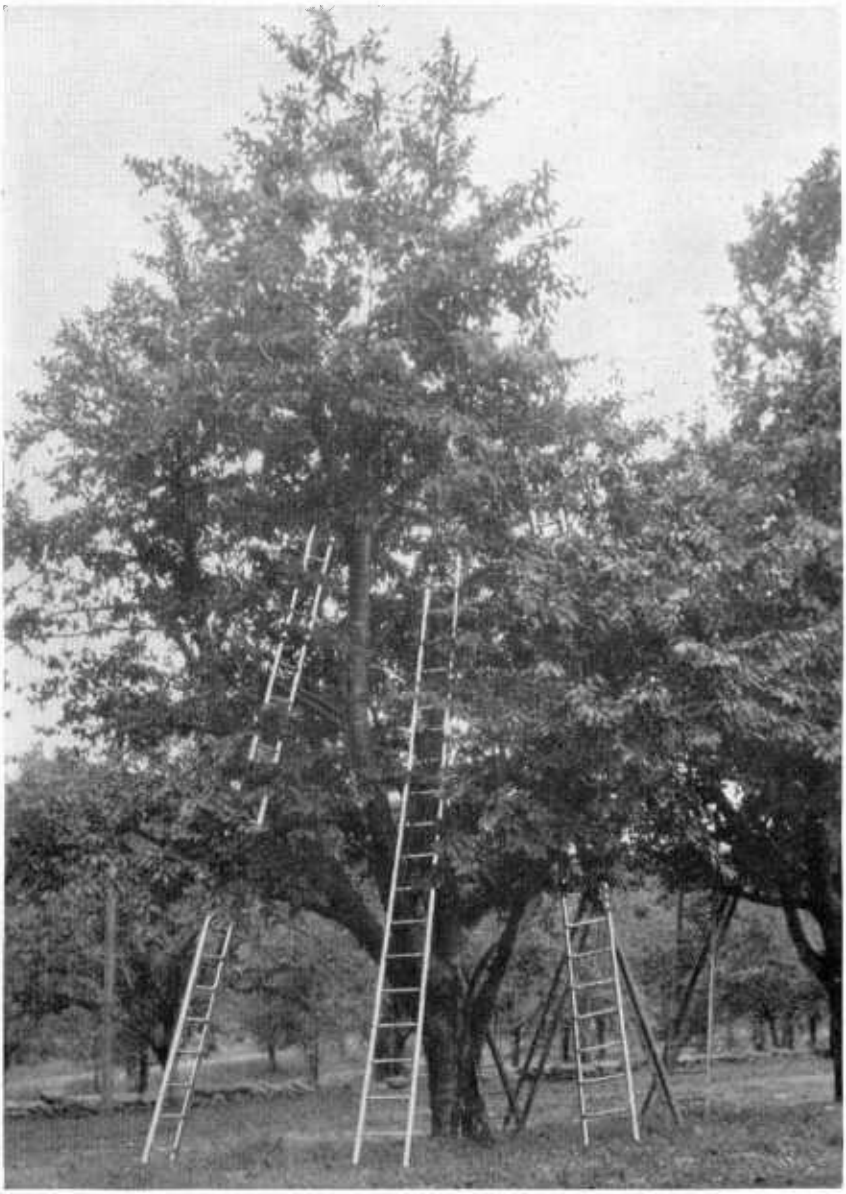

FIGURE 22.—A 35- or 40-year-old Governor Wood sweet-cherry tree. Its height is indicated by the 20-foot ladders. Sometimes a very tall old tree can be improved by being topped back heavily.

FIGURE 23.—Picking Montmorency cherries without stems for a processing plant. Generally tin pails or wooden lugs are used as orchard containers.

before they are fully ripe. The fruits usually increase rather rapidly in both size and weight during the last 2 or 3 days before full ripeness is reached. Instances have been reported of an increase in weight of 10 percent gained by delaying picking for 2 days. Better flavor and quality result from allowing the fruits to remain on the tree as long as is consistent with the use to be made of them.

PACKING

Various methods of handling the fruit after it is picked are followed by different growers. Where baskets are used, it may be packed in the orchard. In some sections a movable packing house is provided; a common type is shown in figure 24. This house is built on runners, so that it can be moved readily from place to place by a team or tractor. In this case the fruit is placed by the pickers in veneer boxes holding 1 quart, and the boxes are packed in 16-quart cases, or crates, like those at the right in figure 24.

Various styles of packages are used in shipping from the different sections. A 16-quart case, or crate (fig. 24), is in general use in certain sections; the 15-pound California lug and the 4-quart climax basket are also used to some extent. Locally the American and various other types of crates with 1-quart veneer filler baskets, commonly employed in shipping strawberries, are also used.

FIGURE 24.—A movable type of packing house used in handling cherries. The 16-quart case, one style of which is shown here, is a popular package in some sections.

DESCRIPTION OF VARIETIES

Relatively few important cherry varieties are grown in eastern United States. Only those most commonly grown are listed and described here.

Montmorency is by far the leading sour variety, as it should be. There may be some strains of this variety that will be valuable for certain characteristics, especially to lengthen the season, but no specific suggestions of strains to plant seem justified at present. Montmorency is self-fruitful, and it is not often of any advantage to have another variety interplanted with it. The next most important sour varieties, English Morello and Early Richmond, also set good crops without cross-pollination with other varieties.

The Duke cherries, which are hybrids of sour and sweet cherries, have some characteristics of each (fig. 25). They vary considerably in their pollination requirements. The early-flowering Dukes, such as Brassington and Reine Hortense, should be interplanted with sweet cherries and the late-flowering ones, such as Royal Duke, with sour varieties.

Sweet-cherry varieties are often separated into two groups—the heart, or soft-fleshed, type, such as Seneca or Governor Wood, and the bigarreau, or firm-fleshed, type, such as Windsor or Napoleon. The leading sweet varieties for eastern United States are Windsor, Schmidt, Lambert, and Napoleon; Seneca and Black Tartarian are

sometimes desirable because of their earliness. All sweet varieties are self-unfruitful; it is therefore necessary to plant different varieties near enough to each other to insure transfer of pollen from one variety to another, Furthermore, three common varieties, Bing, Lambert, and Napoleon, will not pollinate each other; some other variety such as Windsor must therefore be used with them.

SOUR VARIETIES

The principal sour-cherry varieties are described in order of their ripening as follows:

Early Richmond.—Early, ripening 7 to 10 days before Montmorency. Fruits red, small to medium-sized, of only fair quality at best. Value doubtful, suggested only because of early ripening; trend away from it toward early strains of Montmorency.

Montmorency.—Midseason. Fruits bright red, large, of high quality. Trees vigorous and high yielding on good soil. Leading sour-cherry variety, the only one grown by many of the most successful growers.

English Morello.—Late, ripening 10 days to 2 weeks after Montmorency. Fruits almost black when fully ripe, medium-sized; juice high in sugar, but so high in acid that a sour flavor results. Trees spreading, small (therefore sometimes used in home-garden plantings). Most commonly grown of Morello type, but this type not recommended for general planting because of low yield, limited demand for the fruit, and susceptibility to leaf spot.

DUKE VARIETIES

The Duke cherries should be used in only a trial way unless there is a known demand for fruit of this type. They are neither sweet nor sour but a blend of these two types. Most people find them too sour for eating fresh, but many prefer them for canning, freezing, and pie making. The following varieties, listed in the order of their ripening dates, are suggested:

Brassington.—Ripening during sweet-cherry season or soon afterward. Fruits red, medium-sized, quality more like that of sweet cherries than that of sour ones. Trees often lacking in vigor, breaking easily, and low yielding. Preferred by many for pie making.

Reine Hortense.—Midseason. Fruits light red, large, sweeter than those of Brassington, soft-fleshed, juicy, of poor keeping quality. Trees more vigorous and productive than those of Brassington, but also breaking easily. Duke variety that should be used most often.

Royal Duke.—Latest of Duke varieties listed. Fruits dark red, medium-sized to large, slightly sweeter than the sour types, attractive. Trees often vigorous, high yielding, resembling the sour varieties, breaking fairly easily. Preferred by some for pie making and eating fresh.

SWEET VARIETIES

Sweet-cherry varieties are not so dependable as sour ones in most sections. They are more subject to difficulty in starting the trees, frost damage, cracking of fruit, brown rot, and loss of fruit through birds.

The preferable sweet varieties in eastern United States are Windsor, Lambert, Schmidt, and Napoleon. Seneca is sometimes planted for a very early variety; Black Tartarian and Victor are planted to ripen slightly later but before the main season. Yellow Spanish is one of the varieties most hardy under low winter temperatures. Schmidt is relatively resistant to sudden changes in temperature during the winter. Trees of Schmidt, Black Tartarian, and Napoleon are up-

FIGURE 25.—Duke cherry trees 8 years old. Because of the very upright habit of growth and the heavy foliage, individual branches are not visible.

right growing, and those of Seneca and Windsor are more spreading. Fruits of Windsor are relatively resistant to brown rot; those of Black Tartarian and Seneca are very susceptible to this disease.

The varieties are listed here in the approximate order of their ripening, but during the latter part of the main picking season there is not much difference.

Seneca.—Very early. Fruits red, medium-sized, of good quality, soft-fleshed, juicy. Often used where very early variety desired, but frequently fruits largely destroyed by birds.

Black Tartarian.—Early. Fruits purplish black, small to medium-sized, of good quality, soft-fleshed, juicy. Used principally to lengthen season in home plantings and for local sales.

Victor.—Early. Fruits light-colored with pink blush, medium-sized to large, firm-fleshed. Trees strong and productive.

Bing.—Midseason. Fruits very dark red to black, large, of high quality, firm-fleshed; very attractive when fully ripe, but often cracking open and rotting before fully ripe. Less satisfactory in the East than in the West because of susceptibility to winter injury, cracking, and brown rot in the East. Trees generally only fairly vigorous and productive in the East.

Napoleon (Royal Anne).—Midseason. Fruits light yellow with pink blush, large, of high quality, firm-fleshed, subject to less extensive cracking and rotting than Bing during moist seasons. Trees vigorous, productive, and fairly tolerant of low winter temperatures. Most commonly grown light-colored sweet cherry.

Yellow Spanish.—Midseason. Fruits yellow with pinkish blush and attractive ground color, smaller than those of Napoleon, of good quality, firm-fleshed. One of the most winter-hardy sweet cherries.

Lambert.—Midseason. Fruits dark red, large, firm-fleshed, attractive in spite of being subject to cracking. Trees vigorous, strong, productive, and fairly hardy. Considered a standard variety.

Windsor.—Medium late. Fruits dark, changing to black when ripe, medium-sized to large, of high quality, firm-fleshed; smaller and less attractive, but less subject to cracking and rotting, than fruits of Bing, Lambert, and Schmidt and therefore frequently more profitable. Trees spreading, vigorous, productive, and fairly hardy. One of the best varieties for general planting.

Schmidt.—Medium late. Fruits dark red to almost black when ripe, large, of high quality, firm-fleshed, very attractive in spite of being injured sometimes by cracking, but preferable in this respect to Bing and often preferable to Lambert. Trees very vigorous, apparently relatively hardy when low temperatures follow warm periods in winter, but relatively late in coming to full bearing.

DISEASES [3]

The most important fungus diseases of the cherry are leaf spot [4] (fig. 26) of the foliage and brown rot [5] of the fruit.

Leaf spot is caused by a fungus that overwinters on fallen leaves. In the spring spores are ejected from these leaves and are carried by the wind to the new leaves, on which they germinate and cause infection. Small spots, purplish at first but finally brown, develop on the young leaves and produce enormous numbers of summer spores, which spread the infection to adjacent leaves and trees. In mild cases only a small proportion of the leaves may be spotted, but frequently during periods of damp or rainy weather the spots become so numerous that the tree is completely defoliated before the crop is harvested (fig. 27).

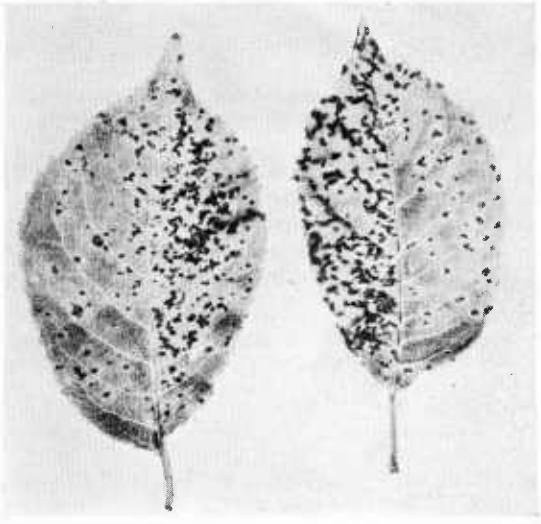

FIGURE 26.—Sour-cherry leaves affected with leaf spot.

The control of leaf spot on sour cherries requires at least four spray applications to be made: (1) As soon as the petals have fallen, (2) when about three-fourths of the shucks have dropped, (3) about 2 weeks later, and (4) immediately after the fruit has been picked. Sour cherries except the English Morello and Wragg varieties are sprayed with lime-sulfur (diluted at the rate of 3 gallons to 100 gallons of water) or bordeaux mixture (6 pounds of copper sulfate and 10 pounds of hydrated lime to each 100 gallons of water). These materials have been used for many years for the control of leaf

[3] Prepared by J. C. Dunegan, senior pathologist, Division of Fruit and Vegetable Crops and Diseases.

[4] Caused by *Coccomyces hiemalis* Higgins.

[5] Caused by *Monilinia fructicola* (Wint.) Honey and *M. laxa* (Aderh. and Ruhl.) Honey.

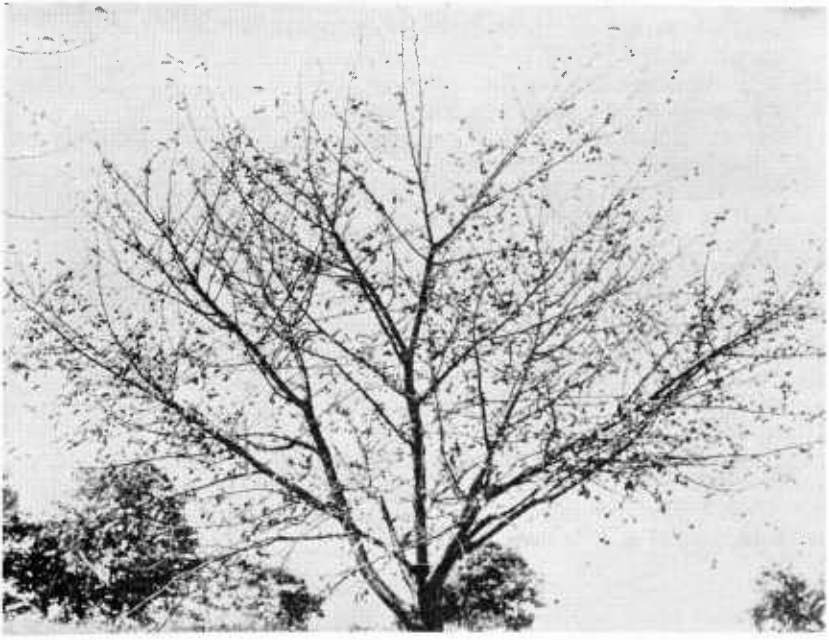

FIGURE 27.—Montmorency cherry tree seriously defoliated by leaf spot.

spot. However, since lime-sulfur is apt to discolor the cherries and bordeaux may reduce their size, many growers now use materials such as the fixed coppers (copper oxychloride compounds), organic fungicides (Fermate, Phygon, Compound 341), or the less caustic forms of sulfur (flotation pastes, wettable sulfurs)[6] to hold the disease in check with the minimum risk of injury. A split schedule, with lime-sulfur (3–100) in the first two applications and a fixed copper (3 pounds of material with 25-percent metallic copper content and 3 pounds of hydrated lime to 100 gallons of water) in the third and fourth applications, has given satisfactory disease control.

Sweet cherries and the English Morello and Wragg varieties of sour cherries should be sprayed at the same periods suggested for the sour cherries. Lime-sulfur (diluted at the rate of 2 gallons to 100 gallons of water) may be used in all four applications, but less injury will result if lime-sulfur is used in the first application only and wettable or flotation sulfur (6 pounds to 100 gallons) in the three other applications. Whenever lead arsenate (p. 29) is included in the spray mixture made with the lime-sulfur substitute, 4 pounds of hydrated lime should be added. Bordeaux mixture and the fixed coppers should never be used on sweet cherries and the English Morello and Wragg varieties of sour cherries because of risk of severely injuring them.

Brown rot, the widespread and destructive fruit rot of peaches and plums, frequently causes heavy losses to cherry growers during seasons when the skin of the fruit has been cracked by excessive rain or hail. The first three spray applications made for control of leaf spot usually

[6] Interested growers should consult their State agricultural colleges for recommendations concerning the fixed copper compounds, organic fungicides, and flotation or wettable sulfurs best suited to their locality.

control the brown rot fungus. If the orchard has had previous outbreaks of brown rot on the fruit, however, an additional spray application should be made just as the fruit begins to color. Many growers prefer to use a wettable sulfur in this preharvest application instead of either lime-sulfur or bordeaux mixture.

Other fungus diseases, such as black knot,[7] powdery mildew,[8] leaf rust,[9] and scab,[10] occur to some extent. As a rule, these diseases are less serious than either leaf spot or brown rot. Most of them are held in check by the applications of spray used to control leaf spot and brown rot.

Yellows of sour cherries, a virus disease, is becoming increasingly important to growers in north-central and northeastern United States. The first symptom of the disease is a green and yellow mottling of the leaves, which is followed by waves of defoliation starting 3 or 4 weeks after petal fall. Trees that have been infected for several years develop abnormally large leaves and few spurs and bear small crops of large fruit. Eventually the trees are lacking in leaves and inside branches. An infected tree never recovers, and its rate of growth and productivity are adversely affected. When purchasing sour-cherry trees from a commercial nursery, the grower should make every effort to obtain trees free of yellows.

INSECTS [11]

The insect pests most commonly found on cherry trees are the black cherry aphid,[12] the plum curculio,[13] two kinds of fruitflies,[14] and the pear slug.[15]

The cherry aphid is a black, shiny insect, which curls the tender young foliage of the sweet cherry early in the season (fig. 28). Often it severely checks growth. Injury to sour cherry is rarely serious. The insects pass the winter as tiny black eggs on the twigs and smaller branches. These eggs hatch in the spring about the time tree growth starts, and the young aphids then cluster on the opening buds.

This aphid may be controlled by thoroughly spraying the trees just as the buds are breaking with nicotine sulfate (40-percent nicotine) at a strength of ¾ of a pint in 100 gallons of water (¾ of a teaspoonful per gallon), to which should be added enough soap to make the mixture soapy to the touch. Spraying later in the season is of little value, because of the protection offered by the curled leaves.

The plum curculio is a small beetle that hibernates in trash in the orchard or near it. Early in the spring, shortly after the cherry trees bloom, the curculios move to the trees. The female inserts the eggs just beneath the skin of the cherries and then makes crescent-shaped slits, each of which partly surrounds an egg puncture (fig. 29). The curculio larvae, or grubs, feed within the cherry for several weeks.

The curculio may be controlled by spraying the trees twice with

[7] Caused by *Dibotryon morbosum* (Schw.) Th. and Syd.
[8] Caused by *Podosphaera oxyacanthae* (DC.) DBy.
[9] Caused by *Tranzschelia pruni-spinosae* (Pers.) Diet.
[10] Caused by *Cladosporium carpophilum* Thuem.
[11] Prepared by B. A. Porter, principal entomologist, Division of Fruit Insect Investigations, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration.
[12] *Myzus cerasi* (F.).
[13] *Conotrachelus nenuphar* (Hbst.).
[14] *Rhagoletis cingulata* (Loew) and *R. fausta* (O. S.).
[15] *Caliroa cerasi* (L.).

lead arsenate, a white or pinkish powder, at a strength of 2 pounds in 100 gallons of water (3 rounded teaspoonfuls per gallon), to which should be added twice as much fresh hydrated lime. The first application should be made 10 days to 2 weeks after petal fall, when the shucks are pushing from the newly formed fruit. The second application should be made 10 days to 2 weeks later. The lead arsenate may be combined with the fungicides used for disease control.

In the Northern States cherries are sometimes infested by the maggots of two species of fruitflies. The adult flies can be killed before they lay their eggs by spraying with lead arsenate, as suggested for the plum curculio. The first application should be made early in

FIGURE 28.—Cherry leaves curled by the cherry aphid.

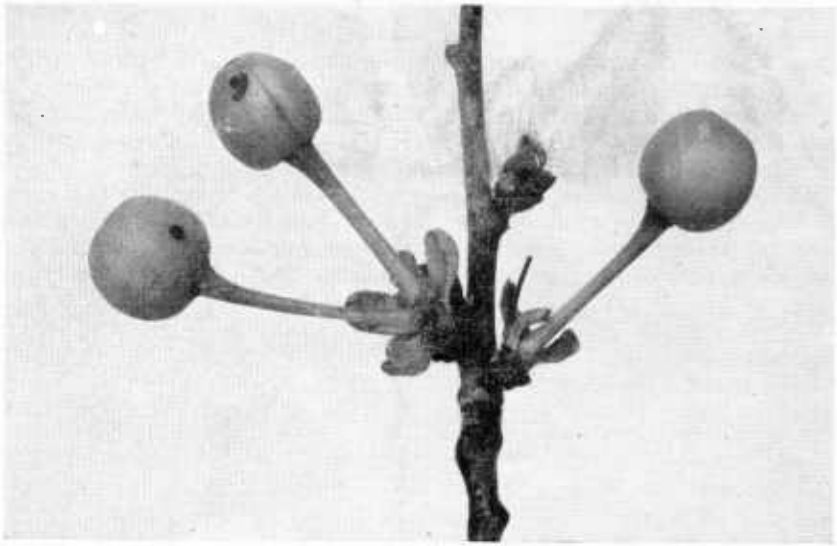

FIGURE 29.—Egg and feeding punctures of curculio on cherries.

June, and the spraying should be repeated once or twice during the succeeding 3 or 4 weeks, depending upon the extent of removal of the arsenical by rains. If spray residue is in evidence when the fruit is picked, it should be removed by thoroughly washing the cherries in a stream of water. The spray-residue problem may be avoided by substituting finely ground cube or derris powder (containing 4 to 5 percent of rotenone) at a strength of 2 to 3 pounds per 100 gallons. The ground derris root should not be combined with a fungicide.

The pear slug, or cherry slug, is a slimy, dark-colored worm that feeds on cherry leaves. The slugs appear on the trees in May or June, according to the locality. A second brood may appear in midsummer or late summer. This pest is readily controlled by spraying the trees with lead arsenate or with ground derris or cube root, as indicated for the plum curculio or the fruitflies.

Two of the materials mentioned for the control of insects are dangerous and should be handled and used with great care. Lead arsenate is very poisonous. It should be stored in tightly closed, plainly labeled containers in a place where it cannot contaminate food or be mistaken for flour or similar food materials or medicines and where children will not have access to it. Nicotine sulfate also is a deadly poison and may cause acute symptoms when the fumes are breathed or when solutions are in contact with the skin for more than a few minutes. Adequate precautions should be taken whenever either of these materials is used.

More detailed information on various cherry insects and their control, applicable to local conditions, may be obtained from the State agricultural colleges or extension services or from local county agricultural agents or farm advisors.

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